

REMARKS/ARGUMENTS

In the Office Action dated May 10, 2006, the Examiner issued an Advisory Action stating that Applicants' arguments previously submitted did not place the application in condition for allowance. Claims 1-10, 12-15, 21-28, and 31-37 remain rejected; claims 11, 16, 29, and 38 remain withdrawn from consideration pursuant to Examiner's restriction; and claims 17-20, 30, 39, and 40 remain objected to as reciting allowable subject matter but depending from a rejected base claim. Claims 1-40 remain pending in the application. Reconsideration and allowance of all pending claims are requested.

The Examiner's comments in the Advisory Action appear to be directed primarily towards the rejection of claims 1-3, 6, 8, 9, 21, 22, 26 and 27 under 35 U.S.C. §103(a) as being obvious over WO 00/37241, to Wilson. The Wilson application ("Wilson") relates to a method for producing articles composed of a thermoplastic polymer reinforced with nanoparticles. In the method, the polymer/nanoparticle combination is melted and the molten material is solidified in a rotating mold cavity (Abstract). In stark contrast, the method recited in, for example, present independent claim 1, includes *inter alia* a vortex "causing the molten composite material to be ejected from the container."

The Examiner remarks that while Wilson does not describe ejecting the molten material from the container, ejecting the molten material would be obvious to one skilled in the art because such a practitioner would understand that the motion of the material in the vortex would continue away from the vortex center "until the forces created inside the structure are neutralized." However, Applicants respectfully point out the well-accepted principle that "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." MPEP 2143.01, citing *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Here, there is no suggestion to modify the Wilson apparatus to achieve ejection of the molten material out of the container, because the solidification in Wilson occurs within the rotating container itself. The Examiner proposes to modify Wilson by allowing ejection of molten material from the container. But the purpose of rotating the container in Wilson is to force molten material into the mold and to hold it there for solidification; ejection of molten material would be contrary to the purpose of filling the

rotating mold. Such a modification, even if possible based on the physics of the situation, cannot properly be termed “obvious” merely because Newtonian physics may say it is possible, absent some suggestion in the prior art to make the modification. Such a suggestion is absent from Wilson and any of the other cited prior art. For this reason, Applicants respectfully submit that claims 1-3, 6, 8, 9, 21, 22, 26 and 27 are patentably distinct from Wilson, and request reconsideration of this rejection.

To ensure that this Response represents a complete treatment of all open issues in the present case, Applicants include the following discussion of the remaining rejection and objections. This discussion is identical to that included in the previously submitted Response.

Claims 1-10, 12-15, 21-28 and 31-37 are rejected under 35 U.S.C. §103(a) as being obvious over US 6,251,159, to Angeliu. The rejection is respectfully traversed.

The Angeliu ‘159 patent relates to methods for dispersion strengthening of metallic melts by adding nanophase particles to the melt and dispersing the particles so that they are spaced from each other at a distance that provides dispersion strengthening (Abstract, claim 1). Dispersion of the particles is accomplished by “convection mixing from the heat of the metallic melt” (col. 4, lines 50-51) or by “an appropriate mixing device, such as a stirrer, electromagnetic mixing, forcing gas mixing, or physical mixing devices” (col. 4, lines 52-55). The patent does not mention rotating the mixture to create a vortex or using the vortex to eject the molten material from the container.

As argued for the Wilson reference, above, Applicants respectfully submit that there is no teaching, suggestion, or disclosure of a vortex that ejects molten material from a container holding the melt. Although Angeliu ‘159 does not specify rotation of the melt container to cause the convection vortex, the Examiner asserts that Angeliu ‘159 indicates the manner of mixing is not critical and may include any of the methods set forth in the above quotation of col. 4, lines 52-55; it is in this passage where the Examiner appears to find a suggestion of rotating the container. However, even if this were taken to be true, Angeliu ‘159 remains deficient because of its failure to fairly suggest or even mention the notion of the rotation, or any other mixing action, causing the ejection of molten material from the container. Angeliu ‘159 merely notes that the melt may be used to make “large castings” (col. 5, lines 21-32). There is no mention of

how these large castings are formed other than to say they may be formed by “solidifying, forging, working, and other metallurgical processes;” certainly there is nothing in the description to suggest the molten material is ejected from the container by the rotation of the container, or by any of the other means Angeliu ‘159 describes as being useful for agitating the melt. Applicants’ claims clearly recite that the ejection of the molten material is caused by the convection vortex created in the melt, and the required suggestion of such a limitation is entirely absent from Angeliu ‘159. As a result, Applicants submit that a *prima facie* case of obviousness has not been established with respect to the Angeliu ‘159 reference. It is believed that the rejection is hereby overcome.

Claims 1-10, 12-15, 21-28 and 31-37 are rejected for nonstatutory obviousness-type double patenting over claims 1-30 of US 6,939,388 to Angeliu. The rejection is respectfully traversed.

The claims of the Angeliu ‘388 patent relate to methods for forming a nanocomposite material by dispersing a nano-sized material in a molten material using ultrasonic energy and solidifying the molten material (claim 1). The Office action admits that the claims do not recite a convection vortex but asserts that it would have been obvious to employ a convection vortex in view of the teaching in the Angeliu ‘159 patent that convection mixing or electromagnetic mixing may be used to disperse nanoparticles in a metallic melt.

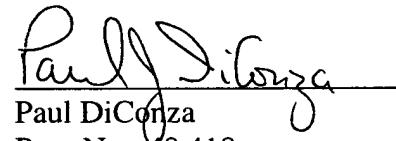
The ‘388 patent has the same deficiency as prior art against Applicants’ claims as has been noted for ‘159: there is not the least suggestion of a vortex that causes the molten material to be ejected from the melt. The shortcomings of ‘159 on this matter have been addressed above. The ‘388 patent claims 1-30 say nothing about ejecting molten material from the melt, and therefore these claims do not disclose or suggest a vortex that ejects the molten material. In the ‘388 claims, the melt is merely recited to be solidified, and in certain claims (e.g., claim 18) this solidification is recited to be via directional solidification or by single crystal solidification. On the contrary, directional solidification and single crystal solidification generally require highly controlled processes to solidify the melt to form material having the desired microstructure. Nothing in any of these claims suggests ejection of molten material from a container

using a vortex. As a result, Applicants submit that a *prima facie* case of obviousness has not been established with respect to the Angeliu '388 reference. It is believed that the rejection is hereby overcome.

Claims 17-20, 30, 39, and 40 were objected to as reciting allowable subject matter but depending from a rejected base claim. Applicants gratefully acknowledge these remarks indicating allowable subject matter. Moreover, Applicants respectfully submit that the base claim rejections have been overcome by the arguments presented above. For these reasons, Applicants respectfully submit that the objection to these claims should be removed.

In view of the foregoing arguments, the Applicants respectfully request reconsideration and prompt allowance of all pending claims 1-27. If the Examiner believes that a telephonic interview will help speed this application towards issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,



Paul DiCorza
Reg. No.: 48,418

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General Electric Company
Building K1, Room 3A60
Telephone: (518) 387-6131
Niskayuna, New York.